UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,974	10/15/2001	E. Jennings Taylor	28850-00032	1056

7590 02/05/2003

Vorys, Sater, Seymour and Pease LLP
Suite 1111
1828 L Street, NW
Washington, DC 20036-5104

EXAMINER
MUTSCHLER, BRIAN L

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 02/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/975,974	TAYLOR ET AL.	
	Examiner	Art Unit	
	Brian L. Mutschler	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 1-7 are objected to because of the following informalities:

   a. In claim 1 at line 2, please change "and" to --an--;

   b. In claim 1 at line 5, please insert a comma --,-- after "therein"; and

   b. In claims 1-7, please use consistent notations for the units, for example in claim 1 at lines 22 and 25, microseconds has been identified by "μs" and "microseconds".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 recites the limitation "about 5% of polyethylene glycol" in lines 4-5. This limitation is indefinite because the criterion on which the percentage is based is not identified, i.e., whether the percentage is based on weight, volume, number of molecules, etc. The limitation should be rewritten to identify the relationship between the polyethylene glycol and the rest of the solution.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-27 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. (U.S. Pat. No. 6,071,398) in view of Barstad et al. (EP 1 054 080 A2).

Regarding claim 1, Martin et al. disclose a method for depositing a uniform layer of copper on the interior surface of through-holes of a printed circuit board having "high aspect ratios" (col. 4, lines 3-6). The method comprises the steps of providing an electrically conductive substrate having through-holes with high aspect ratios and immersing the substrate and a copper anode in an acidic copper plating bath (col. 4, lines 7-15). A current is passed through the electrodes, wherein a forward, cathodic current followed by a reverse, anodic current is passed to plate the copper on the interior of the holes (col. 4, lines 16-49). The cathodic pulses inherently have a charge transfer ratio with respect to the anodic pulses greater than one since the process is a plating process. The cathodic pulses have a duration ranging from 1 to 50 milliseconds, and the anodic pulses have a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 2-4, 6 and 7, the cathodic pulse has a duration ranging from 1 to 50 milliseconds (col. 4, lines 23-34).

Regarding claim 5, the anodic pulse has a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 8-11, based upon the pulse durations taught by Martin et al., the pulse train has a frequency in a range from about 18.5 Hz to 909 Hz.

Regarding claims 12-15, based upon the pulse durations taught by Martin et al., the cathodic pulses have a duty cycle of 20% to 99.8%.

Regarding claims 16-19, based upon the pulse durations taught by Martin et al., the anodic pulses have a duty cycle of 0.2% to 80%.

Regarding claim 27, the plating bath contains copper sulfate, sulfuric acid, chloride ions, a polyoxyalkylene compound carrier, and a sulfur-containing additive that would function as a brightener (col. 4, lines 7-15). The carrier is a surfactant that acts as a suppressor. The bath is devoid of a leveler.

Regarding claim 30, Martin et al. teach the use of a bath comprising 9.6 to 48 g/L $CuSO_4$, a molar ratio of sulfuric acid to copper sulfate of about 6:1 to 47:1, a chloride ion concentration of 60 ppm, and about 15 mL/L of a carrier comprising a surface active compound such as a polyoxyalkylene compound (col. 4, lines 7-15).

Although Martin et al. disclose that the method is used for "electrodepositing copper onto printed circuit boards with high aspect ratios, where aspect ratio is board thickness divided by hole diameter," Martin et al. do not disclose the range of aspect ratios for which the method may be applied, as recited in claim 1 and in claims 20-26. The method of Martin et al. further differs from the instant invention because Martin et al. do not disclose the use of polyethylene glycol, as recited in claim 30.

Regarding claims 1 and 20-26, Barstad et al. disclose a method and plating solution for plating microvias, wherein "microvias with...aspect ratios of 5:1, 6:1, 7:1, 10:1 or greater, and even up to 15:1 or greater can be effectively plated...using plating solutions of the invention" (col. 10, lines 44-53). The plating bath does not require the use of levelers although their use is preferred (col. 3, lines 19-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the method of Martin et al. to plate cavities or through-holes having an aspect ratio of greater than 20:1 because Martin et al. disclose that the method is used for "high aspect ratios" and Barstad et al. teach that similar methods and plating baths can be used to plate through-holes with aspect ratios of 15:1 or greater. One skilled in the art would have reasonably expected success using this method for through-holes having aspect ratios greater than 20:1 because Barstad et al. suggested that the method can be used for plating through-holes of 15:1 or greater.

Regarding claim 30, Barstad et al. teach that the suppressor agent can comprise polyoxyalkylene amines, polyethylene glycols and polyoxyalkylene glycols (col. 8, par. [0039]). The carrier agent is used in concentrations of 1 to 10,000 ppm based on the weight of the bath (col. 9, par. [0041]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the carrier agent in the method of Martin et al. to use polyethylene glycol in place of polyoxyalkylene compounds because Barstad et al.

teach that polyoxyalkylene compounds and polyethylene glycol are equivalent in their use as carrier (surfactant) compounds.

6. Claims 1-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. (U.S. Pat. No. 6,071,398) in view of Anthony (U.S. Pat. No. 4,396,467).

Regarding claim 1, Martin et al. disclose a method for depositing a uniform layer of copper on the interior surface of through-holes of a printed circuit board having "high aspect ratios" (col. 4, lines 3-6). The method comprises the steps of providing an electrically conductive substrate having through-holes with high aspect ratios and immersing the substrate and a copper anode in an acidic copper plating bath (col. 4, lines 7-15). A current is passed through the electrodes, wherein a forward, cathodic current followed by a reverse, anodic current is passed to plate the copper on the interior of the holes (col. 4, lines 16-49). The cathodic pulses inherently have a charge transfer ratio with respect to the anodic pulses greater than one since the process is a plating process. The cathodic pulses have a duration ranging from 1 to 50 milliseconds, and the anodic pulses have a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 2-4, 6 and 7, the cathodic pulse has a duration ranging from 1 to 50 milliseconds (col. 4, lines 23-34).

Regarding claim 5, the anodic pulse has a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 8-11, based upon the pulse durations taught by Martin et al., the pulse train has a frequency in a range from about 18.5 Hz to 909 Hz.

Regarding claims 12-15, based upon the pulse durations taught by Martin et al., the cathodic pulses have a duty cycle of 20% to 99.8%.

Regarding claims 16-19, based upon the pulse durations taught by Martin et al., the anodic pulses have a duty cycle of 0.2% to 80%.

Regarding claim 27, the plating bath contains copper sulfate, sulfuric acid, chloride ions, a polyoxyalkylene carrier, and a sulfur-containing additive that would function as a brightener (col. 4, lines 7-15). The carrier is a surfactant that acts as a suppressor. The bath is devoid of a leveler.

Although Martin et al. disclose that the method is used for "electrodepositing copper onto printed circuit boards with high aspect ratios, where aspect ratio is board thickness divided by hole diameter," Martin et al. do not disclose the range of aspect ratios for which the method may be applied, as recited in claim 1 and in claims 20-26.

Anthony discloses a method for plating copper in through-holes using a pulse train of forward and reverse pulses, wherein the through-holes have a diameter "typically equal to or less than about 4 mils...[and a] thickness of the body which typically ranges from about 6 to 100 mils," which relates to an aspect ratio of up to 25:1 (col. 3, lines 54-61). The plating bath uses copper sulfate, sulfuric acid, and a brightener comprising thiourea and molasses (col. 8, lines 15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the method of Martin et al. to plate cavities or

through-holes having an aspect ratio of greater than 20:1 because Martin et al. disclose that the method is used for "high aspect ratios" and Anthony teaches that similar methods and plating baths can be used to plate through-holes with aspect ratios up to 25:1.

7. Claims 1-20 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubin et al. (U.S. Pat. No. 6,491,806) in view of Martin et al. (U.S. Pat. No. 6,071,398).

Regarding claim 1, Dubin et al. disclose a method for plating recesses in a conductive substrate comprising immersing the substrate in a plating bath and passing a modulated reversing electric current through the substrate (col. 5, lines 36-47; col. 7, line 59 to col. 8 line 13). The recess has an aspect ratio of up to 10:1 or higher (col. 6, lines 36-37). The cycle time of the pulsing lies in a preferred range of about 1 ms to 30 sec, a frequency of about 2 Hz to 1000 Hz (col. 8, lines 1-5). Since the method is a plating method, a counter electrode would inherently be present and the cathodic pulses would have a greater charge transfer ratio than that of the anodic pulses.

Regarding claims 8-11, Dubin et al. disclose a preferred pulse train frequency of 2 Hz to 1000 Hz (col. 8, lines 1-5).

Regarding claim 20, Dubin et al. disclose the use of recesses having aspect ratios of 10:1 or greater (col. 6, lines 36-37).

Regarding claims 27-29, Dubin et al. disclose the plating bath containing copper, sulfuric acid, chloride ions, and at least one additive selected from a group comprising suppressing agents, such as polyethylene glycol (col. 2, lines 31-38; col. 4, lines 35-37).

The method of Dubin et al. differs from the instant invention because Dubin et al. does not disclose the duration of the cathodic and anodic pulses and their respective duty cycles, as recited in claims 1-7 and 12-19.

Regarding claim 1, Martin et al. disclose a method for depositing a uniform layer of copper on the interior surface of through-holes of a printed circuit board having "high aspect ratios" (col. 4, lines 3-6). The method comprises the steps of providing an electrically conductive substrate having through-holes with high aspect ratios and immersing the substrate and a copper anode in an acidic copper plating bath (col. 4, lines 7-15). A current is passed through the electrodes, wherein a forward, cathodic current followed by a reverse, anodic current is passed to plate the copper on the interior of the holes (col. 4, lines 16-49). The cathodic pulses inherently have a charge transfer ratio with respect to the anodic pulses greater than one since the process is a plating process. The cathodic pulses have a duration ranging from 1 to 50 milliseconds, and the anodic pulses have a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 2-4, 6 and 7, the cathodic pulse has a duration ranging from 1 to 50 milliseconds (col. 4, lines 23-34).

Regarding claim 5, the anodic pulse has a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 12-15, based upon the pulse durations taught by Martin et al., the cathodic pulses have a duty cycle of 20% to 99.8%.

Regarding claims 16-19, based upon the pulse durations taught by Martin et al., the anodic pulses have a duty cycle of 0.2% to 80%.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the pulse durations and duty cycles in the method of Dubin et al. to use the pulse durations and duty cycles taught by Martin et al. because the pulse duration and duty cycles are variables that one skilled in the art would select based upon the desired properties of the plated substrate as Martin et al. teach, "power is supplied for as long as is necessary to produce the desired deposits" (col. 4, lines 33-34).

8. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. (U.S. Pat. No. 6,071,398) in view of either Barstad et al. (EP 1 054 080 A2) or Anthony (U.S. Pat. No. 4,396,467), as applied above to claims 1-27, and further in view of Chen (U.S. Pat. No. 6,197,181).

Martin et al., Barstad et al. and Anthony describe a method teaching the limitations recited in claims 1-27 of the instant application, as explained above in sections 5 and 6.

The method described by Martin et al., Barstad et al. and Anthony differs from the instant invention because they do not teach the use of a plating bath devoid of

brighteners, as recited in claim 28, or a plating bath devoid of brighteners and levelers, as recited in claim 29.

Chen discloses a method for plating copper in cavities using a plating bath comprising sulfuric acid, copper, chloride ions and organic additives, wherein "the organic additives may include levelers, brighteners, wetting agents and ductility enhancers" (col. 7, lines 1-24). Chen also disclose, "the organic additives are not absolutely necessary to the plating reaction" (col. 7, lines 10-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method taught by Martin et al., Barstad et al. and Anthony to use a plating bath without levelers or brighteners because Chen teaches that such additives are not necessary to the plating reaction. Deleting the brighteners and levelers from the plating bath would reduce the cost of plating the workpieces.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-27 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 6,309,528 in view of Martin et al. (U.S. Pat. No. 6,071,398) and in view of either Barstad et al. (EP 1 054 080 A2) or Anthony (U.S. Pat. No. 4,396,467).

US '528 claims a method for plaiting recesses in an electrically conductive substrate by immersing the substrate and a counter electrode in a bath and passing a current between the electrodes (claim 1). A modulated reversing current is passed through the electrodes comprising a cathodic pulse having a duty cycle of greater than about 50% and an anodic duty cycle of less than 50% (claim 1). The frequency of the pulse train ranges from 10 to 5000 Hz (claim 1). The claims are silent with regard to the use of levelers and brighteners.

The method disclosed in claims 1-23 of US '528 differs from the instant invention because US '528 does not claim the aspect ratio, as recited in claims 1 and 20-26, or the duration of the pulse lengths, as recited in claims 1 and 2-7.

Regarding claim 1, Martin et al. disclose a method for depositing a uniform layer of copper on the interior surface of through-holes of a printed circuit board having "high aspect ratios" (col. 4, lines 3-6). The method comprises the steps of providing an electrically conductive substrate having through-holes with high aspect ratios and immersing the substrate and a copper anode in an acidic copper plating bath (col. 4, lines 7-15). A current is passed through the electrodes, wherein a forward, cathodic

current followed by a reverse, anodic current is passed to plate the copper on the interior of the holes (col. 4, lines 16-49). The cathodic pulses inherently have a charge transfer ratio with respect to the anodic pulses greater than one since the process is a plating process. The cathodic pulses have a duration ranging from 1 to 50 milliseconds, and the anodic pulses have a duration ranging from 0.1 to 4 milliseconds (col. 4, lines 23-34).

Regarding claims 12-15, based upon the pulse durations taught by Martin et al., the cathodic pulses have a duty cycle of 20% to 99.8%.

Regarding claims 16-19, based upon the pulse durations taught by Martin et al., the anodic pulses have a duty cycle of 0.2% to 80%.

Regarding claim 27, the plating bath contains copper sulfate, sulfuric acid, chloride ions, a polyoxyalkylene carrier, and a sulfur-containing additive that would function as a brightener (col. 4, lines 7-15). The carrier is a surfactant that acts as a suppressor. The bath is devoid of a leveler.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of US '528 to use the pulse durations taught by Martin et al. because the pulse duration is a variable that one skilled in the art would select based upon the desired properties of the plated substrate, and Martin et al. disclose, "power is supplied for as long as is necessary to produce the desired deposits" (col. 4, lines 33-34).

Regarding claims 1 and 20-26, Barstad et al. disclose a method and plating solution for plating microvias, wherein "microvias with...aspect ratios of 5:1, 6:1, 7:1, 10:1 or greater, and even up to 15:1 or greater can be effectively plated...using plating solutions of the invention" (col. 10, lines 44-53). The plating bath does not require the use of levelers although their use is preferred (col. 3, lines 19-20). Anthony discloses a method for plating copper in through-holes using a pulse train of forward and reverse pulses, wherein the through-holes have a diameter "typically equal to or less than about 4 mils...[and a] thickness of the body which typically ranges from about 6 to 100 mils," which relates to an aspect ratio of up to 25:1 (col. 3, lines 54-61). The plating bath uses copper sulfate, sulfuric acid, and a brightener comprising thiourea and molasses (col. 8, lines 15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the method of US '528 to plate cavities or through-holes having an aspect ratio of greater than 20:1 because Barstad et al. and Anthony teach that similar methods and plating baths can be used to plate through-holes with aspect ratios of 15:1 or greater, and with aspect ratios up to 25:1.

11. Claims 1-29 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-61 of copending Application No. 10/132,399 in view of either Barstad et al. (EP 1 054 080 A2) or Anthony (U.S. Pat. No. 4,396,467).

The copending application claims a method for depositing a continuous layer of metal in recesses on an electrically conductive substrate immersed with a counter electrode in a plating bath (claim 1). A modulated reversing electric current is passed through the electrodes comprising a cathodic pulse with a pulse duration of 0.12 milliseconds to 198 milliseconds and an anodic pulse with a pulse duration of 2 microseconds to 60 milliseconds (claim 1). These pulse durations yield a pulse train frequency of about 4 Hz to about 8200 Hz, and a frequency of 5 Hz to 4000 Hz is further claimed (claim 27). The plating bath is substantially devoid of at least a leveler or a brightener, and can also be devoid of both (claim 51). The cathodic duty cycle ranges from 60% to 99%, and the anodic duty cycle ranges from 1% to 40% (claims 31-36).

The method claimed in the copending application differs from the instant invention because the copending application does not disclose the aspect ratio of the recesses, as recited in claims 1 and 20-26.

Regarding claims 1 and 20-26, Barstad et al. disclose a method and plating solution for plating microvias, wherein "microvias with...aspect ratios of 5:1, 6:1, 7:1, 10:1 or greater, and even up to 15:1 or greater can be effectively plated...using plating solutions of the invention" (col. 10, lines 44-53). The plating bath does not require the use of levelers although their use is preferred (col. 3, lines 19-20). Anthony discloses a method for plating copper in through-holes using a pulse train of forward and reverse pulses, wherein the through-holes have a diameter "typically equal to or less than about 4 mils...[and a] thickness of the body which typically ranges from about 6 to 100 mils," which relates to an aspect ratio of up to 25:1 (col. 3, lines 54-61).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the method of the copending application to plate cavities or through-holes having an aspect ratio of greater than 20:1 because Barstad et al. and Anthony teach that similar methods and plating baths can be used to plate through-holes with aspect ratios of 15:1 or greater, and with aspect ratios up to 25:1.

This is a provisional obviousness-type double patenting rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (703) 305-0180. The examiner can normally be reached on Monday-Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

blm
January 28, 2003